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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/700,063

10/31/2003

Richard Edwin Warren JR.

RD-27511-1

3737

6147

7590

06/02/2006

GENERAL ELECTRIC COMPANY  
GLOBAL RESEARCH  
PATENT DOCKET RM. BLDG. K1-4A59  
NISKAYUNA, NY 12309

EXAMINER

ELVE, MARIA ALEXANDRA

ART UNIT

PAPER NUMBER

1725

DATE MAILED: 06/02/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/700,063	WARREN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	M. Alexandra Elve	1725	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 13 March 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 7-22 is/are rejected.
- 7) ☒ Claim(s) 4-6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)     | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date. _____  | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3 & 7-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Staver et al. (USPN 6,002,706) in view of O'Loughlin et al. (USPN 6,512,584), Dykes et al. (USPN 6,548,782) and Staver et al. (USPN 5,987,042).

Staver et al. ('706) discloses the control of a laser beam used for laser shock peening. The mechanical stresses generated by the laser pulse are typically very sensitive to the characteristics of the laser pulse. Another important parameter is the fluence which has an impact on the compressive stresses generated. A known method of estimating laser areas is by using coupons or films. The apparatus comprises a beam splitter which divides the laser beam into a first portion and a second portion, a lens which focuses the first portion of the laser beam for incidence on a target, a detector which receives the second portion of the laser beam and which generates a signal representative of a spatial energy distribution of the laser beam, a digitizer which digitizes the signal from the detector, a data analyzer which receives the digitized signal from the digitizer which calculates a fluence distribution of the laser beam and a lens controller for adjusting a position of the lens with respect to the target based on the

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fluence distribution. The method and apparatus can be used to improve industrial processes such as laser shock peening by monitoring and controlling the fluence of the laser beam. (abstract, figures, col. 1, lines 31-61, col. 2, lines 12-36).

Staver et al. ('706) does not specifically teach the use of a monitor specifically using a laser probe and an overlay, a controller or a laser with Q-switch and a clock signal.

O'Loughlin et al. discloses a quality control system for laser peening. The operation of the laser peening system is tested. Measuring the pressure pulse may be conducted using a separate laser beam (at a different wavelength than that of the laser peening system) off the workpiece and measuring movement of the workpiece surface or vibration caused by the reflected waves. Figure 9 shows the laser apparatus with laser beam (84), which is, receive or detected by (86). This is separate from the laser peening system (10) and peening laser beam (16). (abstract, figures, col. 2, lines 40-55, col. 3, lines 45-48, col. 7, lines 37-50)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a separate laser beam (probe) as taught by O'Loughlin et al. in the Staver et al. ('706) system because this merely a more specific monitoring system.

Dykes et al. disclose a laser shock peening system, which uses an overlay. The laser beam (16) irradiates the workpiece (20) having an overlay (40) while a measurement device (15) measures the thickness of the both overlays (paint and water). The location of the measurement device may be located either near or outside the processing chamber. A control unit, such as a controller (28) is connected to the

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overlay, the workpiece, the measurement device, laser, positioning mechanism and so forth. Thus the system may be controlled real-time during the laser shock peening process. (abstract, figures, col. 4, lines 31-35, col. 6, col. 7, lines 25-67, col. 8, lines 10-53, col. 9, lines 34-47, col. 10, lines 45-51)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use an overlay and a controller, as taught by Dykes et al. in the Staver et al. ('706) system because the laser shock process may be controlled in-process or real-time and yield a product which meets desired parameters or predetermined ranges. Additionally, the overlay is merely a variation of the laser shock peening process.

Staver et al. ('042) discloses a laser shocking processing system that improves workpiece surface characteristics by the formation of a surface layer in the material, which is in a state of compression. Typically, these systems use a transparent inertial confinement layer such as water. Laser pulses have to be controlled by a master clock trigger in order to optimize the exposure of the workpiece to laser peening. Actively controlling the relative timing of the laser pulse and the opening of the optical switch will result in a defined pulse that has a shape for effectively generating the desired mechanical stresses in the laser shock peened workpiece (target). The pulse generator controls the laser by actuating a high voltage relay, powered by a high voltage power supply that opens and closes the Q-switch in the laser oscillator. (abstract, figures, col. 1-2, col. 3, lines 22-50)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a laser with Q-switch and a clock signal, as taught by Staver et al.

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('042) in the Staver et al. ('706) system because well defined and accurately spaced laser shock peening pulses will effectively generate the desired mechanical stresses in the laser shock peening workpiece (target).

### ***Allowable Subject Matter***

Claims 4-6 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the claims as supported by the specification differs from the prior art in that it does not teach a system for laser shock peening having a logical AND gate coupled to the detector and pinhole aperture aligned with the detector.

### ***Response to Arguments***

Applicant's arguments filed 3/13/06 have been fully considered but they are not persuasive.

Applicant argues that the monitor is with respect to the quality of the fluid film. The examiner respectfully notes that this limitation is not in instant claims. Thus the argument is moot. Furthermore, the associated "establishing the pulsed laser beam in response to the... quality of fluid film", is moot.

Applicant argues that Staver et al. ('706) does not teach monitoring. The examiner agrees this limitation is taught by the secondary references.

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Applicant argues that the prior art does not teach monitoring at the target site. The examiner respectfully notes that the target site is monitored close by, albeit not exact at the site. Furthermore, rearrangement of parts was held to have been obvious. In re Japikse 86 USPQ 70.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

May 30, 2006.



M. Alexandra Elve  
Primary Examiner 1725